ARS MATHEMATICA CONTEMPORANEA

ISSN 1855-3966 (printed edn.), ISSN 1855-3974 (electronic edn.)
ARS MATHEMATICA CONTEMPORANEA 16 (2019) 527–547
https://doi.org/10.26493/1855-3974.1475.3d3
(Also available at http://amc-journal.eu)

Smooth skew morphisms of dihedral groups*

Na-Er Wang , Kan Hu

Department of Mathematics, Zhejiang Ocean University, Zhoushan, Zhejiang 316022, P.R. China and
Key Laboratory of Oceanographic Big Data Mining & Application of Zhejiang Province, Zhoushan, Zhejiang 316022, P.R. China

Kai Yuan

School of Mathematics, Capital Normal University, Beijing 100037, P.R. China

Jun-Yang Zhang

School of Mathematical Sciences, Chongqing Normal University, Chongqing 401331, P.R. China

Received 4 September 2017, accepted 17 January 2019, published online 28 March 2019

Abstract

A skew morphism φ of a finite group A is a permutation on A fixing the identity element of A and for which there exists an integer-valued function π on A such that $\varphi(ab) = \varphi(a)\varphi^{\pi(a)}(b)$ for all $a, b \in A$. In the case where $\pi(\varphi(a)) = \pi(a)$, for all $a \in A$, the skew morphism is smooth. The concept of smooth skew morphism is a generalization of that of t-balanced skew morphism. The aim of this paper is to develop a general theory of smooth skew morphisms. As an application we classify smooth skew morphisms of dihedral groups.

Keywords: Cayley map, skew morphism, smooth subgroup.

Math. Subj. Class.: 05E18, 20B25, 05C10

*The authors are grateful to the anonymous referees for their helpful comments and suggestions which have improved the content and presentation of the paper. This research was supported by the following grants: Zhejiang Provincial Natural Science Foundation of China (No. LY16A010010, LQ17A010003); National Natural Science Foundation of China (No. 11801507, 11671276); Teacher Professional Development Program of Zhejiang Provincial Education Department (No. FX2017029); Basic Research and Frontier Exploration Project of Chongqing (No. cstc2018jcyjAX0010); Science and Technology Research Program of Chongqing Municipal Education Commission (No. KJQN201800512); Natural Science Foundation of Fujian (No. 2016J01027).

E-mail addresses: wangnaer@zjou.edu.cn (Na-Er Wang), hukan@zjou.edu.cn (Kan Hu), pktide@163.com (Kai Yuan), jyzhang@cqnu.edu.cn (Jun-Yang Zhang)

ISSN 1855-3966 (tiskana izd.), ISSN 1855-3974 (elektronska izd.)
ARS MATHEMATICA CONTEMPORANEA 16 (2019) 527–547
https://doi.org/10.26493/1855-3974.1475.3d3
(Dostopno tudi na http://amc-journal.eu)

Gladki poševni morfizmi diedrskih grup*

Na-Er Wang , Kan Hu

Department of Mathematics, Zhejiang Ocean University, Zhoushan, Zhejiang 316022, P.R. China and
Key Laboratory of Oceanographic Big Data Mining & Application of Zhejiang Province, Zhoushan, Zhejiang 316022, P.R. China

Kai Yuan

School of Mathematics, Capital Normal University, Beijing 100037, P.R. China

Jun-Yang Zhang

School of Mathematical Sciences, Chongqing Normal University, Chongqing 401331, P.R. China

Prejeto 4. septembra 2017, sprejeto 17. januarja 2019, objavljeno na spletu 28. marca 2019

Povzetek

Poševni morfizem φ končne grupe A je permutacija elementov grupe A, ki fiksira enotski element grupe A in za katero obstaja taka celoštevilska funkcija π na A, da je $\varphi(ab) = \varphi(a)\varphi^{\pi(a)}(b)$ za vse $a, b \in A$. Poševni morfizem je gladek, če za vse $a \in A$ velja $\pi(\varphi(a)) = \pi(a)$. Pojem gladkega poševnega morfizma je posplošitev pojma t-uravnoteženega poševnega morfizma. Cilj tega članka je razviti splošno teorijo gladkih poševnih morfizmov. Kot primer uporabe te teorije klasificiramo gladke poševne morfizme diedrskih grup.

Ključne besede: Cayleyjev zemljevid, poševni morfizem, gladka podgrupa.

Math. Subj. Class.: 05E18, 20B25, 05C10

*Avtorji so hvaležni anonimnim recenzentom za njihove koristne pripombe in predloge, ki so izboljšali vsebino in slog članka. To raziskavo so podprle naslednje dotacije: Zhejiang Provincial Natural Science Foundation of China (No. LY16A010010, LQ17A010003); National Natural Science Foundation of China (No. 11801507, 11671276); Teacher Professional Development Program of Zhejiang Provincial Education Department (No. FX2017029); Basic Research and Frontier Exploration Project of Chongqing (No. cstc2018jcyjAX0010); Science and Technology Research Program of Chongqing Municipal Education Commission (No. KJQN201800512); Natural Science Foundation of Fujian (No. 2016J01027).

E-poštni naslovi: wangnaer@zjou.edu.cn (Na-Er Wang), hukan@zjou.edu.cn (Kan Hu), pktide@163.com (Kai Yuan), jyzhang@cqnu.edu.cn (Jun-Yang Zhang)